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## Test 1435: John Deere 8650 Diesel 16-Speed

Nebraska Tractor Test Lab

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# NEBRASKA TRACTOR TEST 1435 — JOHN DEERE 8650 DIESEL 16 SPEED

## POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb	

## MAXIMUM POWER AND FUEL CONSUMPTION

* Rated Engine Speed—Two Hours (PTO Speed—993 rpm)									
238.56 (177.89)	2100	15.364 (58.159)	0.449 (0.273)	15.53 (3.059)	184 (84.2)	66 (19.0)	75 (23.7)	28.670 (96.814)	

## VARYING POWER AND FUEL CONSUMPTION—Two Hours

207.37 (154.64)	2148	13.876 (52.526)	0.466 (0.283)	14.95 (2.944)	180 (82.2)	66 (18.9)	76 (24.4)	.....	.....
0.00 (0.00)	2243	4.136 (15.656)	.....	.....	172 (78.1)	66 (18.9)	75 (23.9)	.....	.....
106.44 (79.37)	2200	8.960 (33.917)	0.586 (0.357)	11.88 (2.340)	178 (81.4)	66 (19.2)	76 (24.4)	.....	.....
239.17 (178.35)	2100	15.482 (58.606)	0.451 (0.274)	15.45 (3.043)	184 (84.7)	67 (19.4)	76 (24.4)	.....	.....
53.43 (39.84)	2220	6.591 (24.950)	0.859 (0.523)	8.11 (1.597)	174 (78.9)	66 (18.9)	76 (24.4)	.....	.....
157.41 (117.38)	2172	11.334 (42.904)	0.501 (0.305)	13.89 (2.736)	180 (82.2)	66 (18.9)	76 (24.2)	.....	.....
<b>Av 127.30</b> <b>Av (94.93)</b>	<b>2180</b>	<b>10.063</b> <b>(38.093)</b>	<b>0.551</b> <b>(0.335)</b>	<b>12.65</b> <b>(2.492)</b>	<b>178</b> <b>(81.3)</b>	<b>66</b> <b>(19.1)</b>	<b>76</b> <b>(24.3)</b>	<b>28.653</b> <b>(96.758)</b>	

## DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption		Temp. °F (°C)		Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	

## Maximum Available Power—Two Hours 7th (C1) Gear

219.93 (164.00)	14865 (66.12)	5.55 (8.93)	2100	3.41	15.419 (58.366)	0.488 (0.297)	14.26 (2.810)	182 (83.1)	57 (13.9)	63 (16.9)	28.925 (97.675)
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## 75% of Pull at Maximum Power—Ten Hours 7th (C1) Gear

170.50 (127.14)	11099 (49.37)	5.76 (9.27)	2164	2.60	12.898 (48.826)	0.527 (0.320)	13.22 (2.604)	180 (82.3)	54 (12.1)	55 (12.7)	28.777 (97.176)
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## 50% of Pull at Maximum Power—Two Hours 7th (C1) Gear

116.02 (86.51)	7402 (32.93)	5.88 (9.46)	2184	1.66	10.070 (38.118)	0.604 (0.368)	11.52 (2.270)	181 (82.8)	67 (19.2)	71 (21.4)	28.755 (97.101)
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## 50% of Pull at Reduced Engine Speed—Two Hours 10th (D1) Gear

116.21 (86.66)	7402 (32.93)	5.89 (9.47)	1350	1.49	8.562 (32.410)	0.513 (0.312)	13.57 (2.674)	182 (83.1)	68 (20.0)	74 (23.1)	28.735 (97.034)
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## MAXIMUM POWER IN SELECTED GEARS

178.18 (132.87)	28257 (125.69)	2.36 (3.81)	2141	14.53	2nd (A2) Gear		181 (82.8)	50 (10.0)	52 (11.1)	28.920 (97.659)
217.28 (162.03)	21915 (97.48)	3.72 (5.98)	2101	5.37	3rd (A3) Gear		182 (83.1)	56 (13.3)	59 (15.0)	28.930 (97.692)
220.79 (164.65)	19847 (88.28)	4.17 (6.71)	2099	4.67	4th (B1) Gear		182 (83.3)	56 (13.3)	59 (15.0)	28.920 (97.659)
212.64 (158.56)	16909 (75.21)	4.72 (7.59)	2100	3.81	5th (A4) Gear		182 (83.3)	55 (12.8)	58 (14.4)	28.920 (97.659)
216.40 (161.37)	15387 (68.44)	5.27 (8.49)	2100	3.41	6th (B2) Gear		183 (83.6)	55 (12.8)	58 (14.4)	28.920 (97.659)
221.80 (165.40)	14982 (66.64)	5.55 (8.93)	2101	3.33	7th (C1) Gear		182 (83.1)	52 (11.1)	55 (12.8)	28.930 (97.692)
216.11 (161.16)	11612 (51.65)	6.98 (11.23)	2100	2.60	8th (C2) Gear		182 (83.1)	56 (13.3)	59 (15.0)	28.930 (97.692)
217.70 (162.34)	10574 (47.04)	7.72 (12.42)	2099	2.44	9th (B3) Gear		181 (82.8)	56 (13.3)	60 (15.6)	28.930 (97.692)
215.88 (160.98)	8881 (39.50)	9.12 (14.67)	2099	1.87	10th (D1) Gear		182 (83.3)	56 (13.3)	60 (15.6)	28.930 (97.692)

Department of Agricultural Engineering

Dates of Test: May 13-24, 1982

Manufacturer: JOHN DEERE TRACTOR  
WORKS, Waterloo, Iowa 50704

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel  
Cetane No. 46.6 (rating taken from oil company's  
inspection data) **Specific gravity converted to 60°/**  
**60° (15°/15°)** 0.8364 **Fuel weight** 6.964 lbs/gal  
(0.835 kg/l) **Oil SAE 15W40 API service classi-**  
**fication** CD CC SD **To motor** 6.098 gal (23.082 l)  
**Drained from motor** 5.379 gal (20.360 l) **Trans-**  
**mission and hydraulic lubricant** John Deere Hy-  
Gard transmission and hydraulic oil **Total time**  
**engine was operated** 36.0 hours.

**ENGINE:** Make John Deere Diesel **Type** six  
cylinder vertical with turbocharger and  
intercooler **Serial No.** 6619AR-11 044713RG  
**Crankshaft** lengthwise **Rated rpm** 2100 **Bore**  
**and stroke** 5.125" × 5.00" (130.2 mm × 127.0 mm)  
**Compression ratio** 15.2 to 1 **Displacement** 619  
cu in (10143 ml) **Starting system** 12 volt **Lubrica-**  
**tion pressure** **Air cleaner** two paper elements  
with aspirator **Oil filter** one full flow cartridge  
and one bypass cartridge **Oil cooler** engine  
coolant heat exchanger for crankcase oil, radiator  
for hydraulic and transmission oil **Fuel filter** two  
paper elements **Muffler** vertical **Cooling**  
**medium temperature control** three thermostats.

**CHASSIS:** **Type** four wheel drive with duals  
**Serial No.** \*RW8650H001584\* **Tread width** rear  
66" (1680 mm) to 129" (3280 mm) front 66" (1680  
mm) to 129" (3280 mm) **Wheel base** 125" (3175  
mm) **Center of gravity** (without operator or bal-  
last, with minimum tread, with fuel tank filled and  
tractor serviced for operation) Horizontal distance  
forward from center-line of rear wheels 66.0"  
(1675 mm) Vertical distance above roadway 41.3"  
(1049 mm) Horizontal distance from center of rear  
wheel tread 0.9" (23 mm) to the right **Hydraulic**  
**control system** direct engine drive **Transmission**  
selective gear fixed ratio with partial (2) range  
operator controlled power shift **Advertised**  
**speeds mph (km/h)** first 2.1 (3.4) second 2.6 (4.2)  
third 3.8 (6.1) fourth 4.2 (6.8) fifth 4.7 (7.6) sixth  
5.3 (8.5) seventh 5.5 (8.9) eighth 6.9 (11.1) ninth  
7.6 (12.2) tenth 9.0 (14.4) eleventh 9.5 (15.3)  
twelfth 10.0 (16.1) thirteenth 11.2 (18.0) four-  
teenth 12.4 (20.0) fifteenth 16.2 (26.0) sixteenth  
20.2 (32.5) reverse 4.1 (6.6), 5.1 (8.2), 8.2 (13.3),  
10.3 (16.5), 10.9 (17.5), 13.5 (21.7) **Clutch** wet  
multiple disc hydraulically power actuated and  
operated by foot pedal **Brakes** wet disc hydraul-  
ically power actuated and operated by foot pedal  
**Steering** hydrostatic and articulated **Turning**  
**radius** (on concrete surface without brake) right  
245" (6.22 m) left 245" (6.22 m) **Turning space**  
**diameter** (on concrete surface without brake)  
right 499" (12.67 m) left 499" (12.67 m) **Power**  
**take-off** 993 rpm at 2100 engine rpm.

# **LUGGING ABILITY IN 7th (C1) GEAR**

Crankshaft Speed rpm	2101	1889	1681	1471	1261	1051
Pull—lbs (kN)	14982 (66.64)	17105 (76.09)	18134 (80.66)	20056 (89.21)	20049 (89.18)	19036 (84.68)
Increase in Pull %	0	14	21	34	34	27
Power—Hp (kW)	221.80 (165.40)	226.39 (168.82)	212.93 (158.78)	204.86 (152.76)	175.43 (130.82)	139.28 (103.86)
Speed—Mph (km/h)	5.55 (8.93)	4.96 (7.99)	4.40 (7.09)	3.83 (6.16)	3.28 (5.28)	2.74 (4.42)
Slip %	3.33	3.81	4.12	4.75	4.75	4.44

# **TRACTOR SOUND LEVEL WITH CAB**

**dB(A)**

Maximum Available Power—Two Hours	76.5
75% of Pull at Maximum Power—Ten Hours	76.5
50% of Pull at Maximum Power—Two Hours	76.5
50% of Pull at Reduced Engine Speed—Two Hours	73.0
Bystander in 15th (D3) gear	88.5

# **TIRES, BALLAST AND WEIGHT**

# **Tested Without Ballast**

<b>Rear Tires</b>	—No., size, ply & psi (kPa)	Four 23.1-34; 8; 12 (85)
<b>Ballast</b>	—Liquid (each)	None
	—Cast Iron (each)	None
<b>Front Tires</b>	—No., size, ply & psi (kPa)	Four 23.1-34; 8; 12 (85)
<b>Ballast</b>	—Liquid (each)	None
	—Cast Iron (each)	None
<b>Height of Drawbar</b>		17.5 in (445 mm)
<b>Static Weight with Operator—Rear</b>		14310 lb (6491 kg)
—Front		15960 lb (7239 kg)
—Total		30270 lb (13730 kg)

**REPAIRS and ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 161°F (71.9°C). Nine gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1435**.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers



**John Deere 8650 Diesel**